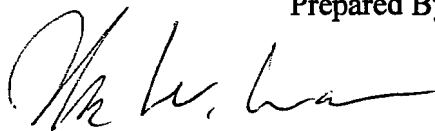


**FINAL REPORT
REMOVAL OF LEAD AND PCB
CONTAMINATED SOIL AT THE
VACANT LOT SITE
NORTH CHICAGO, ILLINOIS
CONTRACT NO. DACW45-94-D-0005
DELIVERY ORDER NO. 55**

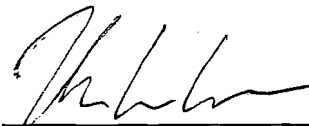
Submitted By:
OHM Remediation Services Corp.

Prepared By:



Thomas W. Warren, CHMM
Senior Project Manager

Approved By:



on behalf of
John R. Hitchings

John R. Hitchings
Program Manager

October 25, 1999
Project 920892

TABLE OF CONTENTS

1.0	INTRODUCTION	1
1.1,	SITE HISTORY	1
1.2,	SITE DESCRIPTION	1
	FIGURE 1.1, SITE LOCATION MAP	2
	FIGURE 1.2, EXISTING SITE CONDITIONS	3
1.3,	PROJECT OBJECTIVES	4
1.4,	PROJECT SCHEDULE	4
	FIGURE 1.3, SCHEDULE	5
2.0	SITE VISIT	6
3.0	OPERATIONAL APPROACH	7
3.1,	MOBILIZATION	7
3.1.1,	PERSONNEL	7
3.1.2,	EQUIPMENT	7
3.2,	SITE PREPARATION	8
3.2.1,	PRE-CONSTRUCTION MEETING	8
3.2.2,	PERIMETER FENCE	8
	FIGURE 3.1, SITE PLAN	9
3.2.3,	RAILROAD PROPERTY ACCESS	10
3.2.4,	SUPPORT AREA	10
3.2.5,	DECONTAMINATION PAD	10
3.2.6,	TEMPORARY CREEK CROSSING	10
3.3,	CLEARING AND GRUBBING	10
3.4,	SOIL EXCAVATION	11
3.4.1,	EXCAVATION OF CREEK SEDIMENTS	11
3.4.2,	EXCAVATION OF PCB SOILS	12

TABLE OF CONTENTS (CONTINUED)

3.5, SOIL STABILIZATION	12
3.6, TRANSPORTATION AND DISPOSAL	12
FIGURE 3.1, TRANSPORTATION AND DISPOSAL TONNAGE BY DATE.....	14
3.6.1, NON-RCRA LEAD CONTAMINATED SOIL	15
3.6.2, NON-RCRA LEAD CONTAMINATED SOIL REQUIRING STABILIZATION	15
3.6.3, NON-RCRA LEAD/NON-TSCA PCB SOIL REQUIRING STABILIZATION	15
3.6.4, TRANSPORTATION AND DISPOSAL DOCUMENTATION	15
3.7, SAMPLING AND ANALYSIS.....	16
3.7.1, DATA TYPES AND SAMPLING ORDER.....	16
3.7.1.1, DATA TYPE AND USES.....	17
3.7.1.2, SITE PRE-CHARACTERIZATION	18
TABLE 3.2 PRE-CHARACTERIZATION FOR LEAD TOXICITY	18
3.7.1.3, PCB DELINEATION	19
FIGURE 3.2, PRE-CHARACTERIZATION GRIDS.....	20
3.7.1.4, WASTE DISPOSAL PROFILING	21
FIGURE 3.3, PCB DELINEATION SAMPLES.....	22
TABLE 3.3, WASTESTREAM COMPOSITE RESULT.....	23-24
3.7.1.5, CONFIRMATION SAMPLING.....	25
3.7.1.5.1, GRID CONFIRMATION.....	25
FIGURE 3.4, VACANT LOT SITE.....	26
TABLE 3.4, AVERAGE DEPTH OF GRID EXCAVATION AND FINAL RESULTS.....	28
3.7.1.5.2, PCB CONFIRMATION.....	29
TABLE 3.5, PCB CONFIRMATION RESULTS.....	29
FIGURE 3.5, PCB CONFIRMATION SAMPLE LOCATIONS.....	30

TABLE OF CONTENTS (CONTINUED)

3.7.1.5.3, TETRACHLOROETHENE CONFIRMATION	31
3.7.1.5.4, FENCE LINE EXCAVATION CONFIRMATION	31
TABLE 3.6, FENCE LINE CONFIRMATION RESULTS	31
3.7.1.5.5, CREEK SLOPE AND SEDIMENT CONFIRMATION	31
TABLE 3.7, CREEK SLOPE AND SEDIMENT CONFIRMATION RESULTS	32
3.7.1.5.6, RAILROAD PROPERTY	32
3.7.1.6, TREATMENT CONFIRMATION	32
3.7.1.7, BACKFILL CONFIRMATION	32
3.7.2, SITE INVESTIGATION OF DISCHARGE PIPES AND UNKNOWN CONTAINER	33
TABLE 3.8, PETTIBONE CREEK DISCHARGE PIPE WATER ANALYSIS	34-35
3.7.3, FIELD ACTIVITIES	36
3.7.3.1, SAMPLING GRID CONFIRMATIONS	36
FIGURE 3.6, 80 FT. X 80 FT. GRID	36
3.7.3.2, MRI GRID CONFIRMATION	36
3.7.3.3, STOCKPILE SAMPLING	37
3.7.3.4, CREEK SLOPE AND SEDIMENT SAMPLING	37
3.7.3.5, BACKFILL SAMPLING	37
3.7.3.6, DOCUMENTATION	38
3.7.3.7, SAMPLE PACKAGING	38
3.7.3.8, DECONTAMINATION PROCEDURES	38
3.8, BACKFILL AND SITE RESTORATION	38
3.9, DEMOBILIZATION	39
4.0, HEALTH AND SAFETY	40
4.1, OSHA RECORDABLE INCIDENT	40
4.2, JOB SAFETY ANALYSIS	40
4.3, REAL-TIME AIR MONITORING	40
4.4, PERSONAL AND PERIMETER AIR SAMPLING	41

5.0, DOCUMENTATION.....42

APPENDICES

APPENDIX A, ACCESS AGREEMENT
APPENDIX B, PRECONSTRUCTION MEETING MINUTES
APPENDIX C, RR ACCESS AGREEMENT
APPENDIX D, WASTE PROFILE FORMS

APPENDIX E, WASTE MANIFEST
..... VOLUMES 1, 2, 3, & 4

APPENDIX F,..... SAMPLE TRACKING LOG

APPENDIX G, ANALYTICAL PACKAGES
..... VOLUMES 1 & 2

APPENDIX H, ACCIDENT REPORT
APPENDIX I, AIR MONITORING ANALYSIS
APPENDIX J, QC DAILY REPORTS
APPENDIX K, DAILY WORK ORDERS
APPENDIX L, WEEKLY STATUS REPORTS

LIST OF ACRONYMS

<i>EE/CA</i>	<i>Engineering Evaluation/Cost Analysis</i>
<i>EJ&E</i>	<i>Elgin, Joliet & Eastern Railway Company</i>
<i>EMCO</i>	<i>EMCO, Inc.</i>
<i>EMT</i>	<i>Environmental Monitoring and Technologies</i>
<i>EPA</i>	<i>Environmental Protection Agency</i>
<i>GLA</i>	<i>Great Lakes Analytical</i>
<i>HDPE</i>	<i>High Density Polyethylene</i>
<i>IEPA</i>	<i>Illinois Environmental Protection Agency</i>
<i>IT</i>	<i>International Technologies</i>
<i>OHM</i>	<i>OHM Remediation Services Corporation</i>
<i>OSHA</i>	<i>Occupational Health Safety and Health Administration</i>
<i>PCB</i>	<i>Polychlorinated Biphenyl's</i>
<i>PERC</i>	<i>Tetrachlorethylene</i>
<i>RCRA</i>	<i>Resource Conservation and Recovery Act</i>
<i>ReCRA</i>	<i>ReCRA Laboratories, Chicago</i>
<i>RMT</i>	<i>RMT, Inc.</i>
<i>RQ</i>	<i>Reportable Quantity</i>
<i>TACO</i>	<i>Tiered Approach Clean-up Objectives</i>
<i>TCLP</i>	<i>Toxicity Characteristic Leaching Procedure</i>
<i>TSCA</i>	<i>Toxic Substances Control Act</i>
<i>USACE OSR</i>	<i>United States Army Corps of Engineers On Site Representative</i>
<i>USACE</i>	<i>United States Army Corps of Engineers</i>
<i>VLSC</i>	<i>Vulcan Louisville Smelting Company</i>
<i>VOC</i>	<i>Volatile Organic Compounds</i>

1.0 INTRODUCTION

The United States Army Corps of Engineers (USACE) tasked OHM Remediation Services Corp./IT Corp. (IT), a wholly owned subsidiary of the IT Group, under Rapid Response Contract No. DACW45-94-D-0005, Delivery Order No. 55, to remove lead and PCB contaminated soil from the Vacant Lot Site located in North Chicago, Illinois.

This final report discusses the work that was performed at the site and contains documentation regarding sampling, chemical analysis, transportation and disposal of wastes, health and safety information, daily work orders and quality control reporting.

1.1 Site History

The presence of contamination at the Vacant Lot Site came to the attention of the U.S. EPA after an underground fire occurred in 1988. Soil samples collected by the Illinois Environmental Protection Agency (IEPA) indicated high E.P.Tox lead concentrations. A source fill area in the northeast portion of the property may have contributed to the fire. Investigations of the site have been conducted by various government agencies.

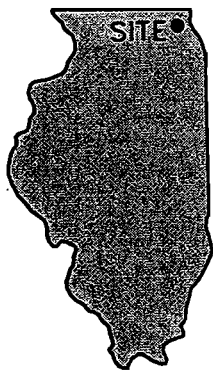
Historical information indicates that the Vulcan Louisville Smelting Company (VLSC) took ownership of the property at some point in time between 1907 and 1921. In 1954, VLSC sold the property to an individual who developed the property as a parking lot. During this period of ownership, the individual solicited fill material for the parking lot area.

The vacant lot site was inactive and being held in trust by the Northern Trust Bank of Lake Forest, Illinois. An access agreement was granted to the EPA from Northern Trust Bank of Lake Forest on August 27, 1998. The Access agreement is presented in Appendix A.

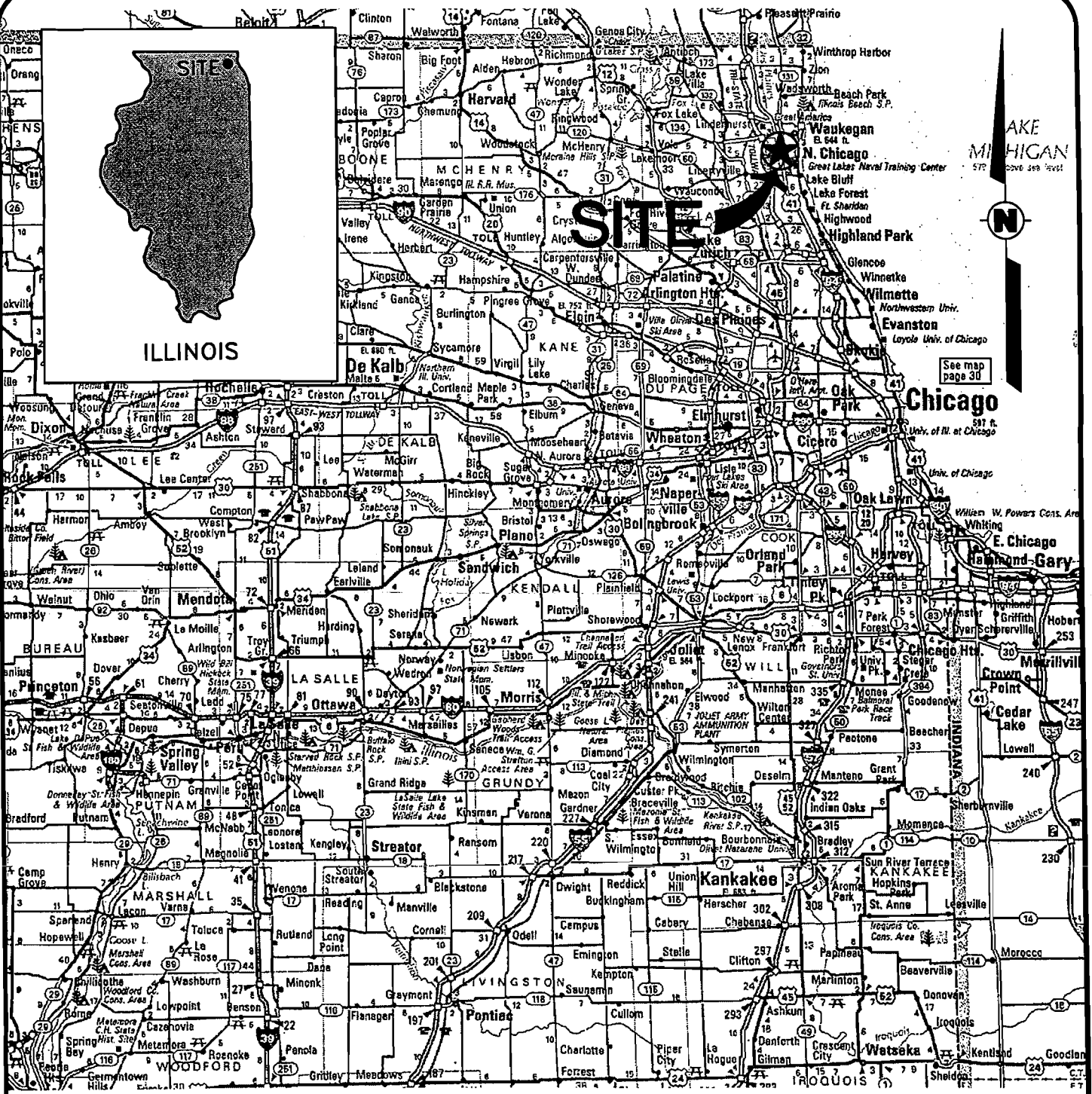
1.2 Site Description

The vacant lot site is a 6.4-acre parcel of land located in the northeast corner of Commonwealth Avenue and 22nd Street/Martin Luther King Jr. Drive in North Chicago, Illinois (see Figure 1.1, Site Location Map). The site is bordered on the north by elevated tracks of Elgin, Joliet & Eastern Railroad, on the east by Fansteel Corporation, on the south by 22nd Street, and on the west by Commonwealth Avenue (see Figure 1.2, Existing Site Conditions).

The general site topography is uniformly flat, with the exceptions of the creek ravine and the relatively steep rise to the railroad tracks along the north edge of the site. The site was vegetated with grass and weeds in most areas. The creek area was heavily overgrown with vegetation, shrubs and trees. As documented by previous reports, there existed weathered concrete/gravel layer under approximately 6 inches of topsoil on the southern



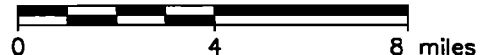
ILLINOIS



REFERENCE:

1997 RAND McNALLY ROAD ATLAS FOR THE UNITED STATES, CANADA, AND MEXICO.

SCALE



OHM Remediation Services Corp.

OHM Project No. 20892

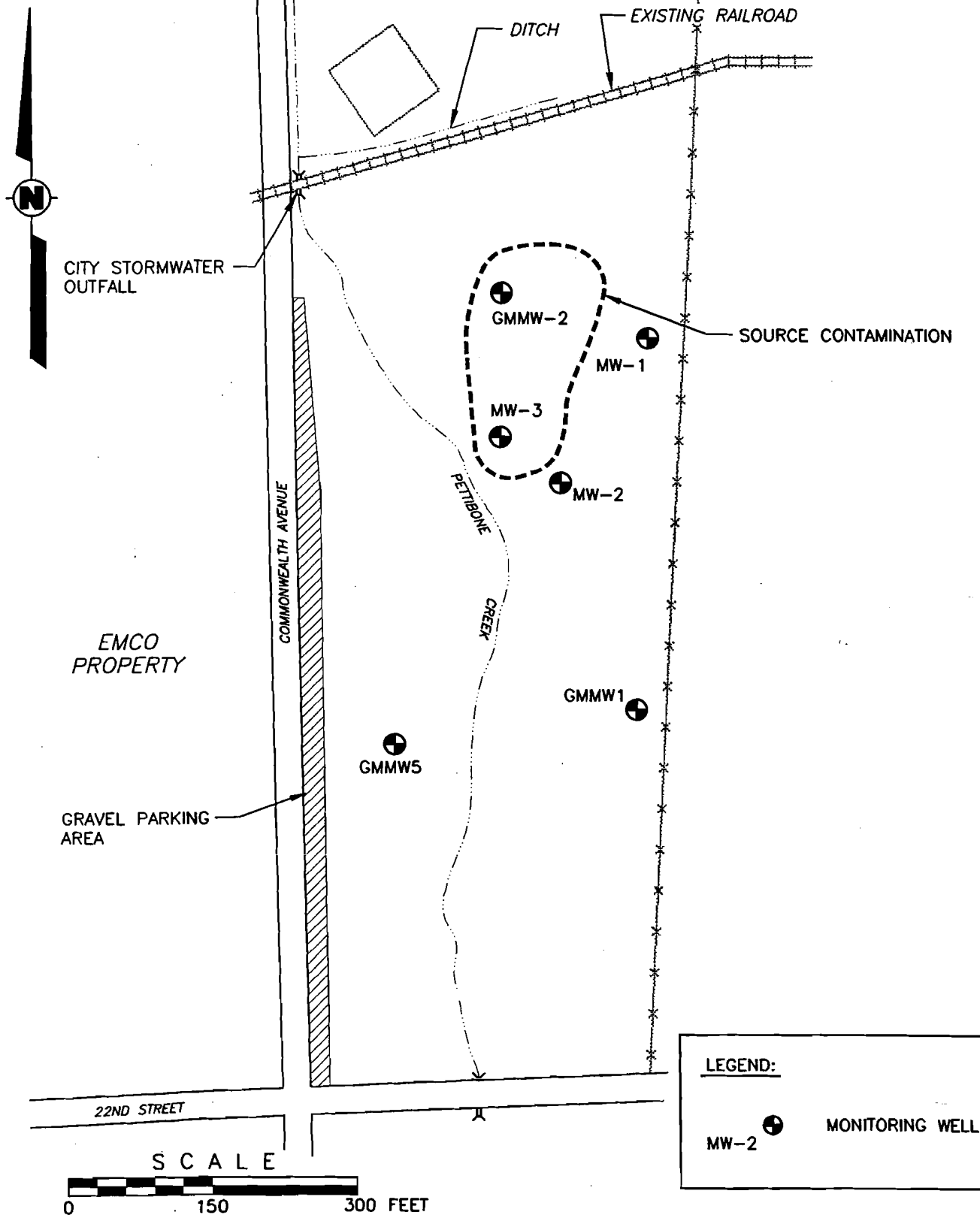
Drawn By: M. Warnick	Checked By: T. Warren	Approved By:
Date: 7/22/98	Scale: AS SHOWN	Drawing No. 20892-A4

FIGURE 1.1

SITE LOCATION MAP
VACANT LOT SITE
NORTH CHICAGO, ILLINOIS

PREPARED FOR

UNITED STATES ARMY CORPS OF ENGINEERS
OMAHA DISTRICT



**OHM Remediation
Services Corp.**

OHM Project No. 20892

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**FIGURE 1.2
EXISTING SITE CONDITIONS
VACANT LOT SITE
NORTH CHICAGO, ILLINOIS**

PREPARED FOR
**UNITED STATES ARMY CORPS OF ENGINEERS
OMAHA DISTRICT**

two-thirds of the site, primarily in the vicinity of the existing roadway. Several areas of the northern one third portion of the site had deposits of slag, ash and cinders.

The site is transected by Pettibone Creek, which lies in a steep sided ravine originating at the northwest site boundary. The ravine is lined with large weeds, bushes and deciduous trees. The creek flows to the south on site and then flows east to finally merge into Lake Michigan approximately 1.5 miles from the site. The flows of the creek were intermittent depending on seasonal moisture. Some areas of the creek contained standing water throughout the project. A steady stream of water entered the site from the north through the creek and quickly exited the site through the northern most culvert pipe. It is suspected that the water re-entered the creek south of the site.

1.3 Project Objectives

The primary objective of the project was to excavate soil from across the site that exceeded the clean-up criteria of 1,400-ppm total lead, 1-ppm beryllium and 25 ppm PCB. Also included in the project objectives was the excavation of creek silt and soil that exceeded the clean-up criteria for lead, beryllium and PAH's.

The primary tasks required to achieve the project objectives included the following:

- Conduct site visit
- Develop project work plans
- Mobilization and site set up
- Clearing and grubbing
- Backfilling as required
- Excavation, stabilization, transportation and disposal of contaminated soil
- Sampling and analytical testing
- Site tear down and demobilization
- Health and safety monitoring
- Develop final report

1.4 Project Schedule

Field work for the vacant lot site began on August 3, 1998 with mobilization of personnel and equipment and continued until demobilization was complete on January 18, 1999 (see Figure 1.3, Project Schedule). In May of 1999 crews returned to the site to excavate, stabilize and dispose of soil from the stockpile area. This work was complete on May 25, 1999.

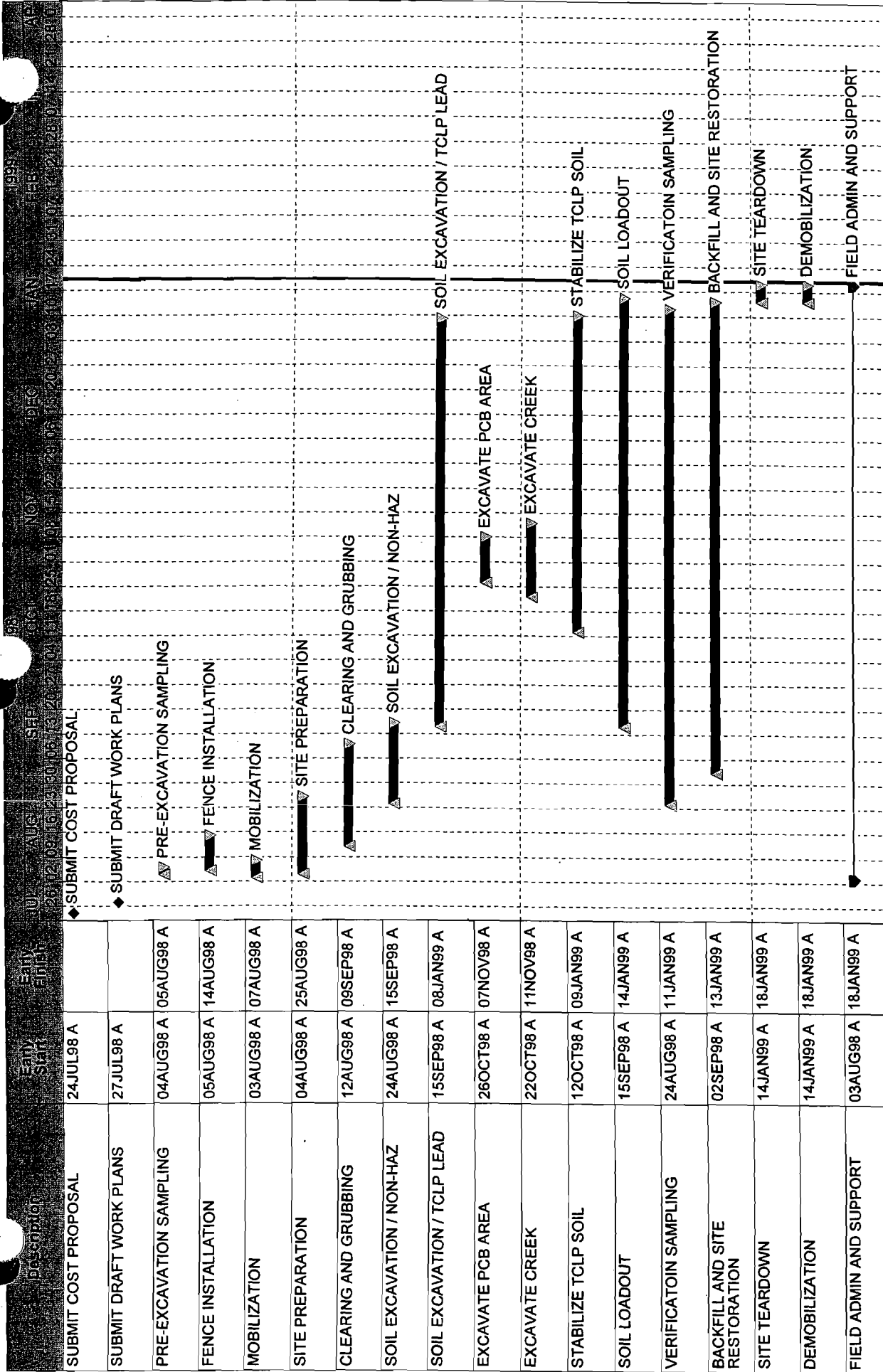


Figure 1.3
U.S. ARMY CORPS OF ENGINEERS
THE IT GROUP
VACANT LOT SITE
NORTH CHICAGO, ILLINOIS

Start date	24JUL98
Finish date	20JAN99
Run date	01JUL99
© Primavera Systems, Inc.	

2.0 **SITE VISIT**

On July 9, 1998, a site visit was conducted. Attendees at the site visit included the remedial project manager and on-scene coordinator from the USEPA, a project engineer from Ecology and Environment, the project engineer and on-site construction representative from the USACE Rapid Response, Omaha District and the program manager and project manager from IT.

During the site visit the project objectives and assumptions were discussed and estimated quantities were established to base the cost proposal and work plans on. The following is the primary objectives, assumptions and quantities established during the site visit.

- The entire site excluding the creek will be excavated to depth of approximately 3 feet. An anticipated quantity of 15,400 cubic yards of lead contaminated soil will require disposal as a non-RCRA industrial waste.
- An additional 185 cubic yards of PCB soil will require excavation and disposal as a TSCA waste.
- The clean up criteria for soil will be 1,400 mg/kg lead, 1.0 mg/kg Beryllium and 25 mg/kg PCB.
- A perimeter chain link fence and security service for non-work hours will be necessary.
- Clear and grub brush and trees as necessary.
- Backfill and re-seed the site.
- Pre and post blood lead samples will be required for personnel working within the exclusion zone.
- Personal and perimeter air monitoring for lead will be performed. The need for continuing air monitoring will be evaluated upon review of initial sampling results.
- The excavation of Pettibone Creek sediments and the excavation of a source area containing TCLP Lead soil may be added to the scope of work later in the project.
- Established the requirements and schedule for development of the cost proposal and project work plans.
- Field work was anticipated to begin in early August 1998.

3.0 OPERATIONAL APPROACH

This section discusses the operational approach implemented to accomplish the fieldwork at the vacant lot site.

3.1 Mobilization

Mobilization was initiated on August 3, 1998. This task involved the mobilization of personnel, equipment and materials to begin the initial phases of site work consisting primarily of site set up and clearing and grubbing. Mobilization was a continuing effort throughout the project. As specific tasks were undertaken, the necessary equipment and materials were obtained and delivered to the site as needed. The initial phase of mobilization was complete on August 7, 1998.

3.1.1 Personnel

The on-site personnel required during peak loading periods throughout the project included the following:

- 1-Project Manager
- 1-Superintendent
- 1-Project Chemist
- 1-Project Accountant
- 1-Health and Safety Officer
- 1-Project Clerk
- 3-Equipment Operators
- 3-Laborers
- 2-Truck Drivers

3.1.2 Equipment

The major equipment required during peak loading periods throughout the project included the following:

- | | |
|-----------------------------|----------------------------|
| ➤ 2- Office Trailers | ➤ 1-All-Terrain forklift |
| ➤ 1-Decontamination Trailer | ➤ 2-Dump Trucks (5 cu.yds) |
| ➤ 2-320 Excavators | ➤ 1-Water Truck |
| ➤ 1- Long Stick Excavator | ➤ 2-Pickup Trucks |
| ➤ 2-Rubber Tired Loaders | ➤ 2-Vans |
| ➤ 1-D4 Dozer | ➤ 2-Cars |
| ➤ 1-D6 Dozer | ➤ 2-Brush Chippers |
| ➤ 1-Tub Grinder | ➤ 1- Storage Container |

3.2 Site Preparation

Site preparation was initiated on August 4, 1999. And was completed on August 25, 1998. Some site preparation activities were unable to be performed until the clearing and grubbing task was well underway. Site preparation consisted of the following tasks:

- Pre-construction meeting
- Installation of perimeter fence
- Construction of gravel support area
- Placement of two office trailers
- Placement of decontamination trailer
- Establish electrical and telephone service
- Installation of decontamination pad
- Construction of temporary soil staging area
- Install road crossing in Pettibone Creek
- Delineate work zones

The site was set up as illustrated in Figure 3.1, Site Plan.

3.2.1 Pre-Construction Meeting

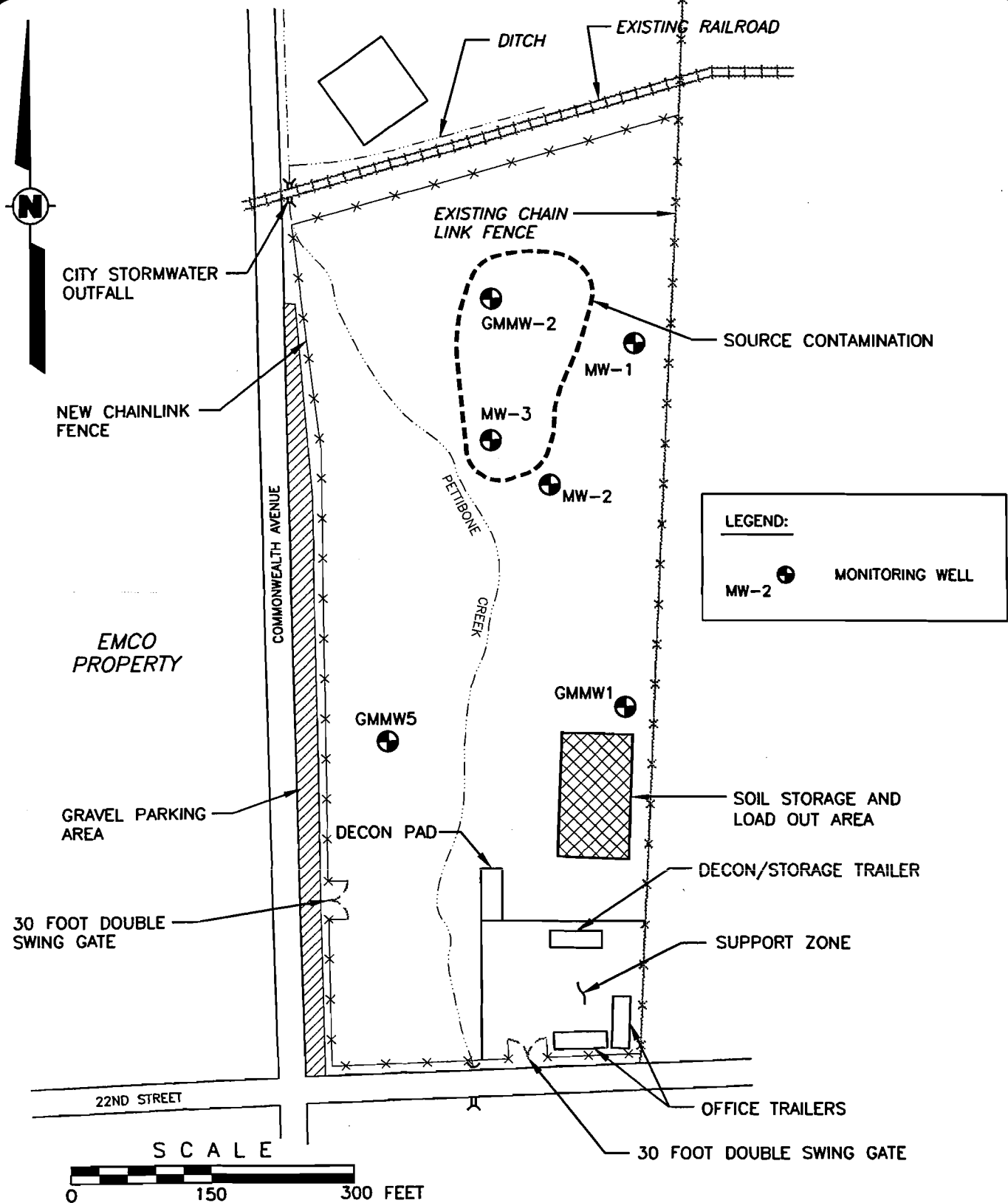
On August 11, 1999 USACE conducted a pre-construction meeting was conducted to discuss the project and respond to any concerns or questions regarding the project. The meeting was conducted at the EMCO Chemical office located adjacent to the site on Commonwealth Avenue. In attendance at the meeting were representative from the following organizations:

- USACE Rapid Response
- USEPA Region 5
- City of North Chicago Building Department
- City of North Chicago Fire Department
- City of North Chicago Police Department
- R. Levin & Sons
- Fansteel Corporation
- EMCO Chemical Inc.
- IT Corporation

The minutes of the pre-construction meeting are presented in Appendix B.

3.2.2 Perimeter Fence

A six foot high perimeter chain link fence was installed on the south, west and north sides of the site. The new fence was tied into the existing fence on the East Side of the site.



**OHM Remediation
Services Corp.**

OHM Project No. 20892

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FIGURE 3.1

**SITE PLAN
VACANT LOT SITE
NORTH CHICAGO, ILLINOIS**

PREPARED FOR

**UNITED STATES ARMY CORPS OF ENGINEERS
OMAHA DISTRICT**

Two 30' wide swing gates were installed for vehicle and truck access. One gate was installed on Martin Luther King Jr. Drive and the other gate was installed on Commonwealth Avenue.

3.2.3 Railroad Property Access

During the installation of the fence along the north side of the site it was discovered that Elgin, Joliet & Eastern Railway Company (EJ&E) owned the property within 50 feet of the railroad tracks. IT was informed that the fence could not be placed on railroad property and a temporary permit would be necessary to perform work on EJ&E property. The fence was erected south of the property line. USACE and EPA instructed IT to obtain the temporary permit to access the property and perform the necessary sampling and excavation. Prior to any further work being performed of EJ&E property, IT obtained the necessary temporary permit. The temporary access permit is presented in Appendix C.

3.2.4 Support Area

A support area was established in the southeast portion of the site adjacent to the access gate on Martin Luther King Jr. Drive. The support area was approximately 100' x 100' in size. Geotextile fabric was placed over the area followed by a 4" layer of gravel. Two office trailers, a decontamination trailer, a storage container, portable toilet facilities and vehicle parking area were located in the support zone. The soil below the support zone was eventually excavated. Items in the support zone were relocated adjacent to the support zone to accomplish the excavation.

3.2.5 Decontamination Pad

A temporary decontamination pad was constructed adjacent to the support area. The decontamination pad was lined with a 40-mil HDPE liner. The pad was approximately 40' x 16' in size and was used for the decontamination of trucks and heavy equipment prior to demobilization from the site.

3.2.6 Temporary Creek Crossing

A temporary truck crossing was installed over Pettibone creek to allow dump truck and heavy equipment to access the entire site. The silt from the crossing area was excavated from the creek bottom at the crossing area. Two 48" culvert pipes were placed on a gravel bed in the creek. Import fill material was placed over the culvert pipe to create the crossing. A six-inch layer of road base was placed over the crossing and jersey barriers were installed along each side of the crossing.

3.3 Clearing and Grubbing

Clearing and grubbing of the site was initiated on August 12, 1998 and continued through September 9, 1999. Initially clearing and grubbing was only to be performed up to the

banks of Pettibone Creek. It was later decided by USACE and EPA to clear and grub the entire site including the large trees near the creek. Clearing was accomplished by using chain saws to cut the trees down and size them into manageable size pieces. The trees were cut as close to ground surface as possible. An excavator was used to remove the remaining stumps. The stumps were disposed of as debris at the Kestrel Hawk Park Landfill in Racine, WI. Once the trees were on the ground, heavy equipment was used to move and stockpile the trees to an area near the support zone. Subcontractors used a combination of two wood chippers and a tub grinder to chip the trees. The resulting wood chips were used over the course of the project to help maintain the integrity of on-site haul roads.

3.4 Soil Excavation

Excavation of contaminated soil was conducted from September 15, 1998 through January 8, 1999. A total of 44,836 tons of contaminated soil was excavated and transported for off-site disposal. The quantities of soil excavated consisted of the following:

- 42,794 tons non-RCRA lead contaminated soil & debris
- 2,042 tons non-RCRA lead / non-TSCA PCB soil & debris

The entire site was excavated including sediments from Pettibone Creek and soil from the railroad property. Depths of excavation ranged from two to five feet in most areas. Several areas required excavation depths up to eight feet. Excavation in the open level areas was accomplished using an excavator to excavate the soil to a minimum depth of two feet. Grid confirmation sample results determined if additional excavation was necessary. In some cases, large amounts of reddish/purple slag were remaining following excavation. This slag was excavated prior to confirmation samples being obtained. During the course of the project, a distinct correlation between the reddish/purple slag and high total lead concentrations was observed. The excavator would place the soil into a dump truck or rubber tired loader for transport to a temporary stockpile. The areas outside the fence along Martin Luther King Jr. Drive and Commonwealth Avenue were excavated on Saturdays when traffic was at a minimum.

3.4.1 Excavation of Creek Sediments

Creek sediments and soil from the slopes of Pettibone Creek were excavated using a long stick excavator. The creek sediments and soil from the slopes were excavated to a minimum depth of two feet. When necessary the sediments were mixed with dry soil from the slopes to absorb the moisture from the wet creek sediments. Approximately 4,600 tons of lead-contaminated sediments and soil was excavated from Pettibone Creek.

3.4.2 Excavation of PCB Soils

The EE/CA identified several areas of PCB contamination above the action level of 25 ppm. Following delineation of the PCB contaminated soils; an excavator was used to excavate the PCB contaminated soil. Rubber tired loaders stockpiled the soil adjacent to the excavation. The PCB contaminated soil exceeded TCLP lead limits and required stabilization prior to disposal as non-RCRA/non-TSCA waste. Approximately 2,042 tons of PCB soil required excavation and disposal. No soil was identified on-site that met or exceeded the TSCA limit for PCB of 50 ppm. Section 3.7, "Sampling and Analysis" discusses the PCB sampling in more detail.

3.5 Soil Stabilization

Approximately 38,094 tons of lead contaminated soil exceeded the RCRA limit of 5.0 mg/L TCLP and required stabilization to reduce the solubility of the lead component prior to disposal as non-RCRA waste. RMT Inc. supplied a product called Enviro Blend to stabilize the leachable lead in the soil. Enviro Blend is a 50% mixture of Enviromag (magnesium oxide) and Envirophos (calcium phosphate). RMT Inc. performed a treatability study on samples of the contaminated soil. A range of mixture rates were tested to define a percentage based on volume per volume (v/v) of Enviroblend that reduced the soils ability to leach lead. The mixture rate ranged from 0.5% to 2.5% v/v. The contaminated soil was placed in 300 to 1000 cubic yard stockpiles. An excavator mixed the pre-determined ratio of Enviroblend into the soil. After the soil was mixed, the on-site chemist obtained a representative sample of the stockpile. An off-site laboratory performed TCLP analysis to determine if the soil was below 5.0 mg/L TCLP for lead. The soil was then disposed of as non-RCRA waste.

3.6 Transportation and Disposal

The work at the vacant lot site generated approximately 44,836 tons of soil and debris that required transportation and disposal as a non-RCRA and non-TSCA regulated waste. The waste was characterized into the following wastestreams:

- Non-RCRA Lead Contaminated Soil 6,742 tons
- Non-RCRA Lead Contaminated Soil Requiring Stabilization 36,052 tons
- Non-RCRA Lead/Non-TSCA PCB Soil Requiring Stabilization 2,042 tons

The soil from each of the three wastestreams is considered non-hazardous by RCRA and TSCA. Due to the reportable quantity (RQ) of lead being 10 pounds, and the potential that a truckload of soil may exceed the RQ, the soil is considered hazardous by DOT. All soil was shipped under the following shipping name:

"RQ, Environmentally Hazardous Substance, Solid, nos (Lead)"
USDOT Hazard Class 9, UN 3077, RQ=10lb.

Two Subtitle D disposal facilities were used for the disposal of soil from the vacant lot site. The facilities were the BFI Landfill in Zion, IL and the Kestrel Hawk Park Landfill in Racine, WI. Table 3.1 Presents the tonnage disposed of at each facility by date.

Figure 3.1
Transportation and Disposal Tonnage by Date

BFI Landfill Zion, IL
Lead Contaminated Soil

Ship Date	Tons Shipped	Total Tons to Date
9/15/98	236.39	236.39
9/16/98	348.94	585.33
9/17/98	500.34	1,085.67
9/18/98	478.30	1,563.97
9/19/98	276.24	1,840.21
9/21/98	623.90	2,464.11
9/22/98	585.46	3,049.57
9/23/98	622.23	3,671.80
9/24/98	614.40	4,286.20
9/25/98	657.71	4,943.91
9/26/98	133.44	5,077.35
9/28/98	546.25	5,623.60
9/29/98	624.24	6,247.84
9/30/98	494.56	6,742.40
10/20/98	516.82	7,259.22
10/21/98	623.90	7,883.12
10/22/98	585.46	8,468.58
10/23/98	264.47	8,733.05
Total		8,733.05

Kestrel Hawk Park Landfill Racine, WI
Lead/Non-TSCA PCB Contaminated Soil

Ship Date	Tons Shipped	Total Tons to Date
12/2/98	337.10	337.10
12/3/98	773.07	1,110.17
12/10/99	932.13	2,042.30
Total		2,042.30

Tonnage Summary

Total Lead Soil	42,794.00
Total Lead/PCB Soil	2,042.00
Total	44,836.00

Kestrel Hawk Park Landfill Racine, WI
Lead Contaminated Soil

Ship Date	Tons Shipped	Total Tons to Date
11/2/98	861.70	861.70
11/3/98	1,315.98	2,177.68
11/4/98	1,337.16	3,514.84
11/5/98	1,520.69	5,035.53
11/6/98	1,493.57	6,529.10
11/9/98	1,208.31	7,737.41
11/13/98	776.48	8,513.89
11/16/98	1,259.29	9,773.18
11/17/98	1,465.67	11,238.85
11/18/98	1,514.06	12,752.91
11/19/98	305.12	13,058.03
11/30/98	615.68	13,673.71
12/1/98	1,089.56	14,763.27
12/2/98	1,039.89	15,803.16
12/3/98	20.23	15,823.39
12/4/98	29.16	15,852.55
12/4/98	599.19	16,451.74
12/7/98	1,046.42	17,498.16
12/8/98	1,345.71	18,843.87
12/10/98	385.62	20,161.62
12/11/98	1,407.35	21,568.97
12/15/98	587.86	22,156.83
12/16/98	1,221.23	23,378.06
12/17/98	760.09	24,138.15
12/18/98	1,291.01	25,429.16
12/21/98	1,364.98	26,794.14
12/22/98	1,077.23	27,871.37
12/23/98	605.06	28,476.43
12/29/98	862.62	29,339.05
1/4/99	407.28	29,746.33
1/7/99	666.67	30,413.00
1/8/99	745.62	31,158.62
1/9/99	453.71	31,612.33
1/11/99	583.66	32,195.99
1/12/99	887.83	33,083.82
1/13/99	855.96	33,939.78
1/14/99	770.10	34,709.88
3/25/99	283.66	34,993.54
Total		34,061.41

3.6.1 Non-RCRA Lead Contaminated Soil

The non-RCRA lead contaminated soil was disposed of at the BFI Landfill in Zion, IL under the following documentation:

<u>Facility Name</u>	<u>Profile Number</u>	<u>Manifest Tracking Numbers</u>
BFI Landfill, Zion, IL	45826	PB001 to PB321

The soil was shipped in semi-trailer dump trucks provided by Rocks-Ann Trucking and Jack Gray Trucking.

3.6.2 Non-RCRA Lead Contaminated Soil Requiring Stabilization

The non-RCRA lead contaminated soil that required stabilization was disposed of at the BFI Landfill in Zion, IL and the Kestrel Hawk Park Landfill in Racine, WI under the following documentation:

<u>Facility Name</u>	<u>Profile Number</u>	<u>Manifest Tracking Numbers</u>
BFI Landfill, Zion, IL	45882	TPB001 to TPB107
Kestrel Hawk Park Landfill, Racine, WI	98195	TPB108 to TPB1709

The soil was shipped in semi-trailer dump trucks by Jack Gray Trucking.

3.6.3 Non-RCRA Lead/Non-TSCA PCB Soil Requiring Stabilization

The non-RCRA lead/non-TSCA PCB soil that required stabilization was disposed of at the Kestrel Hawk Park Landfill in Racine, WI under the following documentation:

<u>Facility Name</u>	<u>Profile Number</u>	<u>Manifest Tracking Numbers</u>
Kestrel Hawk Park Landfill, Racine, WI	486223	TCPB001 to TCPB067

The soil was shipped in semi-trailer dump trucks by Jack Gray Trucking.

3.6.4 Transportation and Disposal Documentation

The waste profile forms for BFI Landfill and Kestrel Hawk Park Landfill are presented in Appendix D. The manifest tracking forms and manifests signed by the disposal facility are presented in Appendix E.

3.7 Sampling and Analysis

OHM performed the removal of Lead-contaminated soils and creek sediments, organic-contaminated creek sediments and a small PCB contaminated area at the 6.4-acre vacant lot site in North Chicago, Illinois.

This section describes IT's responsibilities with respect to the sampling and analysis associated with this work effort and is intended to exhibit the chemical data generated during the site activities in a chronological order. The chemical data is accompanied with the documentation supporting the closure of the site.

There are six types of sampling events associated with this project consisting of site pre-characterization, PCB delineation, waste disposal profiling, confirmation sampling, treatment confirmation and backfill confirmation. The site was pre-characterized for determining the location of the hazardous waste constituents. A small area contaminated with PCB was delineated. All waste streams were analyzed for landfill disposal parameters for acceptability. Excavations were confirmed clean by analysis. Waste piles were treated to stabilize the hazardous lead constituent and were confirmed by analysis. The backfill used was sampled after placement and analyzed for trace contaminants.

3.7.1 Data Types and Sampling Order

Data quality objectives were established for this project to assure the chemical data was of acceptable quality. Accuracy, precision and turn-around-times was the main quality objectives used to check the performance of the laboratory. Through the course of this project three laboratories performed the analysis to support the chemical data needs. The three laboratories used were ReCRA Chicago-Net (ReCRA), Great Lakes Analytical (GLA) and Environmental Monitoring and Technologies (EMT).

ReCRA Chicago-Net was selected to perform all the analysis associated with Landfill Disposal Parameter analyses, PCB Delineation, and other organic analyses required for this project. GLA was selected to perform the Lead and Beryllium analysis. However, the performance by ReCRA did not satisfy project requirements. ReCRA could not meet turn-around-times and therefore did not receive any more samples. Refer to the Sample Tracking Log in Appendix F for detailed accounts. GLA became the laboratory to perform all analysis for the project. Once again this lab was late getting results to the site within the specified turn-around-times. Additional USACE approved labs were researched. ReCRA and GLA were the only USACE approved labs in the local area. The USACE approved the use of an Illinois EPA certified lab in lieu of a USACE approved lab. Environmental Monitoring and Technologies became the selected laboratory to perform all analyses for this project. The lab met all turn-around-times except for one sample, and this did not impact the course of the project. Regardless of who performed the analyses, the data still had to meet project objectives before accepting the data. At no time was the quality of the data compromised. Appendix G contains the data deliverable packages.

3.7.1.1 Data Type and Uses

The data types and uses for this project included the following:

- **Pre-Characterization of Site Soils** – Off-site chemical analysis was performed on the composite samples representing the individual sections of the site. The results were used to define the soils as RCRA hazardous for TCLP Lead or non-RCRA hazardous soils.
- **Determining the Boundary of PCB Contaminated Soils** – Off-site chemical analysis of grab samples was used to define the lateral boundary of the PCB contaminated soils.
- **Waste Disposal Profiling** – Stockpiles of differing waste streams were sampled and analyzed off-site. The data was used to characterize the waste as well as determine the acceptability by selected landfill facility.
- **PCB Screening** – On-site analysis of grab samples collected within the PCB boundary was used to demonstrate that all PCB contaminated soils were removed below action level prior to confirmation sampling.
- **Confirmation of PCB Excavated Area** – Off-site analysis of grab samples based on the MRI grid format was used to demonstrate that all PCB contaminated soils were removed below action levels.
- **Confirmation of Lead/Beryllium Excavated Area** – Off-site analysis of grid composites was performed to demonstrate that all contaminated soils were removed below the action level for lead and beryllium.
- **Confirmation of Lead/Beryllium/PAHs Creek Excavated Areas** – Off-site analysis was performed on composite samples of soils and sediments from Pettibone Creek. The data was used to demonstrate the removal of contaminated soils below the action level.
- **Treatment Confirmation Prior to Disposal** – Off-site chemical analysis was performed on stockpile composite samples to demonstrate that the hazardous lead constituent is below the toxicity level for lead.
- **Backfill Confirmation** – Off-site analysis was performed on backfill material to determine the presence of trace contaminants.

3.7.1.2 Site Pre-Characterization

The site was pre-characterized by identifying the areas that exhibited a RCRA hazardous waste. This process also identified the non-hazardous material that could be directly disposed of as special waste without treatment of any kind. Refer to Table 3.2 for pre-characterization lead toxicity results. A composite sample of non-hazardous soils demonstrated that contaminants were not elevated above the selected landfill's acceptance criteria.

The site was divided into 12 sections. Each section was 160' by 160', (see Figure 3.2, Pre-characterization Grids). Sections PC-09 and PC-11 were not sampled due to trees, creek and railroad property which obstructed sampling or otherwise would not be representative of the section to be excavated. Sections PC-10 and the north half of PC-08 were not sampled due to existing data already covered in the EE/CA report. Ten random locations in each section were selected for the composite of the two feet depth. Nine composite samples plus one duplicate were analyzed. Sections PC-01, PC-03, PC-05, PC-07 and PC-02 were below the TCLP criteria for lead, 5.0 mg/L. Sections PC-04, PC-06, PC-08, and PC-12 failed the TCLP criteria. This information was used to estimate the amount of material to be treated to stabilize the hazardous characteristic.

Twelve composite samples were collected from the slopes of Pettibone Creek to characterize the lead toxicity in the soil. Each section was 160' in length except the last two sections that were 60'. Ten equally distant locations for each section were sampled for the composite, except the last two sections that were 5 locations. Sections PS-07, PS-08, PS-10, and PS-11 failed the TCLP criteria for Lead.

Table 3.2

Pre-characterization for Lead Toxicity

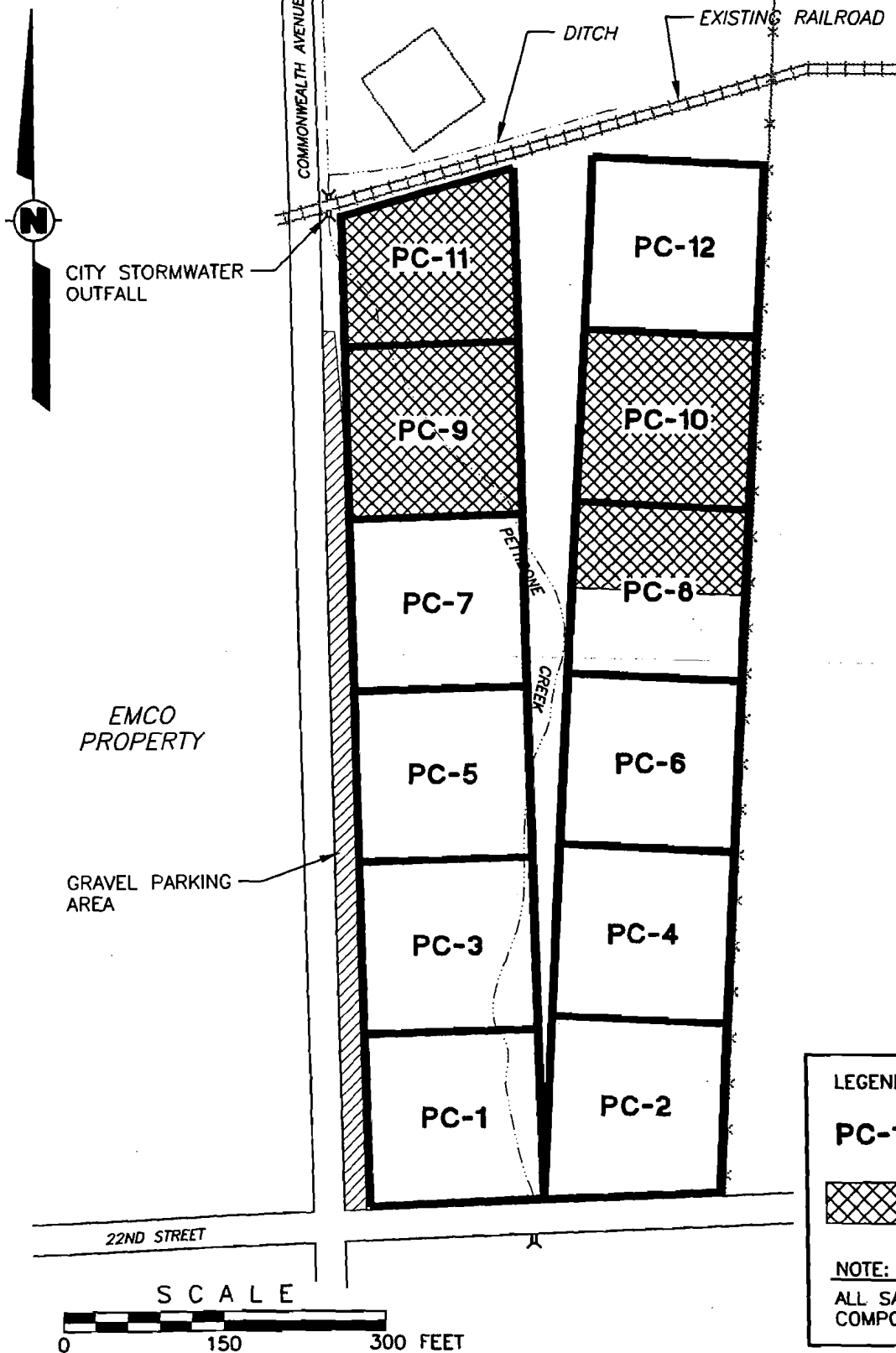
Sample ID	TCLP Lead	Sample ID	TCLP Lead	Sample ID	TCLP Lead
Lead/Beryllium Contaminated Soils					
PC-001	0.462 mg/L	PC-005	0.286 mg/L	PC-008	13.2 mg/L
PC-002	0.314 mg/L	PC-006	10.4 mg/L	PC-012	47.5 mg/L
PC-003	0.195 mg/L	PC-007	0.314 mg/L	PC-013*	10.8 mg/L
PC-004	12.5 mg/L				
Creek Slope Contaminated Soils					
PS-01	1.3 mg/L	PS-06	0.08 mg/L	PS-10	15.0 mg/L
PS-02	0.46 mg/L	PS-07	7.0 mg/L	PS-11	5.2 mg/L
PS-03	2.4 mg/L	PS-08	21.0 mg/L	PS-12	0.19 mg/L
PS-04	0.32 mg/L	PS-09	0.56 mg/L	PS-13*	5.0 mg/L
PS-05	0.39 mg/L				

*PC-013, duplicate of PC-004; PS-013, duplicate of PS-07

3.7.1.3 PCB Delineation

Four locations at three EE/CA nodes were identified in the EE/CA report as having PCB's at levels greater than 25 ppm at depths of one and two feet. The three EE/CA nodes were located by measuring out the distances plotted on the site map found in the scope of work. Actual EE/CA nodes were later plotted using a GPS instrument capable of measurements within three feet. The EE/CA nodes located from a map were within ten feet of the actual locations (see Figure 3.3, PCB Delineation). Four points were located 20 feet in each direction around the EE/CA nodes. A grab sample was collected at a depth of one foot and a depth of two feet. A total of 26 grab samples were collected for this first round. ReCRA was deficient on meeting turn-around times for the PCB analysis. GLA was given the opportunity to perform all analysis for this project.

Additional grab samples were collected 10 feet from sample locations with PCB concentrations greater than 25 ppm. A third and fourth round of sampling was performed to delineate the PCB boundary. During the fourth round additional samples were collected at ten-foot intervals. Samples were only analyzed when the previous sample was greater than 25 ppm. The first sample less than 25 ppm was determined to be the boundary. A total of 56 samples including duplicates were analyzed to determine the lateral boundary.



OHM Remediation Services Corp.

OHM Project No. 20892

Drawn By: R. Weible	Checked By: P. Conley	Approved By: T. Warren
Date: 2/16/99	Scale: AS SHOWN	Drawing No. 20892-A9

FIGURE 3.2
PRE-CHARACTERIZATION GRIDS
VACANT LOT SITE
NORTH CHICAGO, ILLINOIS

PREPARED FOR

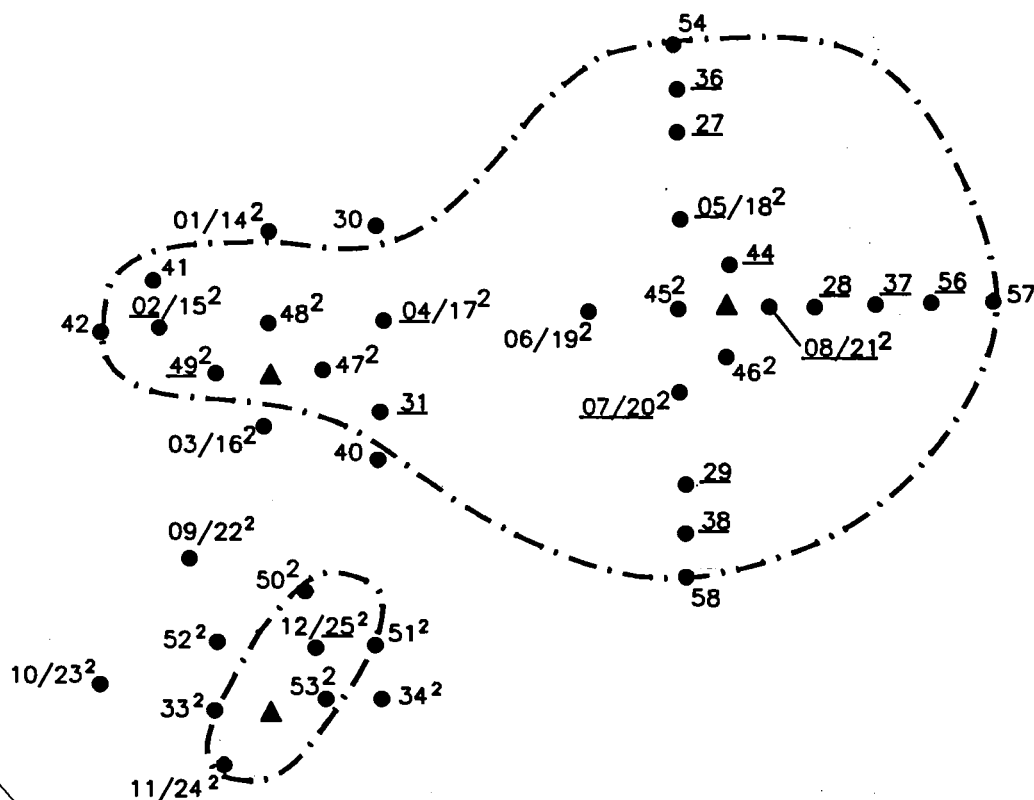
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3.7.1.4 Waste Disposal Profiling

Composite samples of each type of waste stream were analyzed for landfill disposal parameters. This data was used to determine landfill acceptability. The different waste streams are lead-contaminated soils (both non-hazardous and hazardous), PCB and lead contaminated soils, and creek sediment and soils. A ten-point composite made up the sample representing a stockpile. Data from analysis was compared to the landfill acceptance criteria. Any stockpile exhibiting a contaminant that exceeded the acceptance criteria was either treated or accepted by applying for an approved variance.

The analyses were TCLP Metals, TCLP Volatiles, TCLP Semi-Volatiles, TCLP Pesticides, TCLP Herbicides, Total Metals and Conventional analyses, Total Cyanide, EOX, Phenol, Reactive Cyanide and Sulfide, Total Sulfide, pH, percent moisture, Flashpoint, paint filter test and density. See Table 3.3.

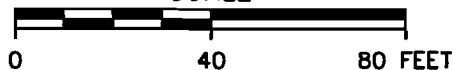
Wastewater from the decontamination process was analyzed for Total PCBs. There was trace amount of PCBs, 2.1 ug/L, in the water. With a site wide cleanup level of 25 ppm for soils, this amount is not a significant quantity to impact soils. Therefore this water was used for dust control for stockpiles.



LEGEND:

- ▲ EE/CA NODE
- SAMPLE LOCATION
- 33² SAMPLE COLLECTED AT 2' DEPTH
- 11/24² FIRST SAMPLE AT 0-2' SECOND SAMPLE AT 2' DEPTH
- 38 ABOVE 25 ppm PCB
- DELINATION

SCALE



**OHM Remediation
Services Corp.**

OHM Project No. 20892

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Date: 16 FEB 99	Scale: AS SHOWN	Drawing No. 20892-A10

FIGURE 3.3
PCB DELINEATION SAMPLES
 VACANT LOT SITE
 NORTH CHICAGO, ILLINOIS
 PREPARED FOR
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OMAHA DISTRICT

Table 3.3
Wastestream Composite Result

Sample ID: Comp-1		Wastestream: Non-hazardous soils – composite sample of PC-001, PC-002, PC-003, PC-005, and PC-007	
Analyte	Result	Analyte	Result
Arsenic, TCLP	<0.10 mg/L	TCLP VOCs	<DL (Detection Limit)
Barium, TCLP	0.795 mg/L	TCLP SVOCs	<DL
Cadmium, TCLP	<0.050 mg/L	TCLP Pesticides	<DL
Chromium (Total), TCLP	<0.050 mg/L	TCLP Herbicides	<DL
Copper, TCLP	2.140 mg/L	Total PCB	<0.009 mg/kg
Lead, TCLP	0.416 mg/L	EOX	<53.5 mg/kg
Nickel, TCLP	0.094 mg/L	Total Phenols	<0.63 mg/kg
Mercury, TCLP	<0.01 mg/L	PH	7.7
Selenium, TCLP	<0.100 mg/L	Paint Filter Test	PASS
Silver, TCLP	<0.05 mg/L	Moisture Content	10 %
Zinc, TCLP	15.9 mg/L	Reactive Cyanide	<0.25 mg/kg
Lead, TOTAL	320 mg/kg	Reactive Sulfide	<0.50 mg/kg
		Flash point	>200 F

Sample ID: Comp-2		Wastestream: Lead hazardous soils – composite of treated batch test pile	
Analyte	Result	Analyte	Result
Arsenic, TCLP	<0.05 mg/L	TCLP VOCs	<DL
Barium, TCLP	<2.0 mg/L	TCLP SVOCs	<DL
Cadmium, TCLP	0.042 mg/L	TCLP Pesticides	<DL
Chromium (Total), TCLP	<0.01 mg/L	TCLP Herbicides	<DL
Copper, TCLP	3.0 mg/L	Total PCB	<DL
Lead, TCLP	0.047 mg/L	EOX	<100 mg/kg
Mercury, TCLP	<0.002 mg/L	Total Phenols	1.9 mg/kg
Selenium, TCLP	<0.01 mg/L	PH	9.6
Silver, TCLP	<0.05 mg/L	Paint Filter Test	PASS
Zinc, TCLP	4.1 mg/L	Moisture Content	16 %
Arsenic, TOTAL	8.4 mg/kg	Reactive Cyanide	<0.13 mg/kg
Barium, TOTAL	410 mg/kg	Reactive Sulfide	<6.5 mg/kg
Cadmium, TOTAL	6.8 mg/kg	Total Cyanide	<0.25
Chromium (TOTAL), TOTAL	23 mg/kg	Total Sulfide	12 mg/kg
Lead, TOTAL	250 mg/kg	Density	2.1 g/ml
Mercury, TOTAL	9 mg/kg	Flash point	>200 F
Selenium, TOTAL	<0.5 mg/kg		
Silver, TOTAL	1.9 mg/kg		
Thallium, TOTAL	<0.5 mg/kg		

Sample ID: CRK-001		Wastestream: Creek Slope soils and creek sediments – composite of stockpile	
Analyte	Result	Analyte	Result
Arsenic, TCLP	<0.05 mg/L	TCLP VOCs	<DL
Barium, TCLP	<2.0 mg/L	TCLP SVOCs	<DL
Cadmium, TCLP	0.22 mg/L	TCLP Pesticides	<DL
Chromium (Total), TCLP	<0.01 mg/L	TCLP Herbicides	<DL
Copper, TCLP	41 mg/L	Total PCB	0.96 mg/kg
Lead, TCLP	8.4 mg/L	EOX	<50 mg/kg
Mercury, TCLP	<0.002 mg/L	Total Phenols	2.3 mg/kg
Selenium, TCLP	<0.01 mg/L	PH	12
Silver, TCLP	<0.05 mg/L	Paint Filter Test	PASS
Zinc, TCLP	61 mg/L	Moisture Content	22 %

Sample ID: CRK-001		Wastestream: Creek Slope soils and creek sediments – composite of stockpile	
Arsenic, TOTAL	13 mg/kg	Reactive Cyanide	<0.25 mg/kg
Barium, TOTAL	150 mg/kg	Reactive Sulfide	<6.5 mg/kg
Cadmium, TOTAL	<0.5 mg/kg	Total Cyanide	<0.25 mg/kg
Chromium (TOTAL), TOTAL	19 mg/kg	Total Sulfide	<3.2 mg/kg
Lead, TOTAL	1800 mg/kg	Density	1.88 g/ml
Mercury, TOTAL	1.6 mg/kg	Flash point	>200 F
Selenium, TOTAL	<0.5 mg/kg		
Silver, TOTAL	<2.5 mg/kg		
Thallium, TOTAL	<25 mg/kg		

Sample ID: PCB-001		Wastestream: PCB-001	
Analyte	Result	Analyte	Result
Arsenic, TCLP	<0.05 mg/L	TCLP VOCs	<DL
Barium, TCLP	<2.0 mg/L	TCLP SVOCs	<DL
Cadmium, TCLP	0.11 mg/L	TCLP Pesticides	<DL
Chromium (Total), TCLP	<0.01 mg/L	TCLP Herbicides	<DL
Copper, TCLP	22 mg/L	Total PCB	20 mg/kg
Lead, TCLP	5.7 mg/L	EOX	<50 mg/kg
Mercury, TCLP	<0.002 mg/L	Total Phenols	2.3 mg/kg
Selenium, TCLP	<0.01 mg/L	PH	8.8
Silver, TCLP	<0.05 mg/L	Paint Filter Test	PASS
Zinc, TCLP	61 mg/L	Moisture Content	20 %
Arsenic, TOTAL	5.9 mg/kg	Reactive Cyanide	<0.25 mg/kg
Barium, TOTAL	94 mg/kg	Reactive Sulfide	<6.5 mg/kg
Cadmium, TOTAL	4.2 mg/kg	Total Cyanide	<0.25 mg/kg
Chromium (TOTAL), TOTAL	14 mg/kg	Total Sulfide	<3.2 mg/kg
Lead, TOTAL	1600 mg/kg	Density	1.85 g/ml
Mercury, TOTAL	35 mg/kg	Flash point	>200
Selenium, TOTAL	<0.5 mg/kg		
Silver, TOTAL	4.3 mg/kg		
Thallium, TOTAL	<25 mg/kg		

3.7.1.5 Confirmation Sampling

Soil sampling and analysis was performed for post excavation confirmation, soil treatment/stabilization confirmation and import backfill confirmation.

3.7.1.5.1 Grid Confirmation

The site was divided into 80' by 80' grids where possible. These grids were then subdivided into four 40' by 40' sub-grids (See Figure 3.4, Excavation Confirmation Grids). A five-point composite was collected from each sub-grid. The four sub-grid composite samples were then composited into one grid sample. Sufficient sample was maintained from each sub-grid for additional analysis if necessary. If a grid sample result is less than 1,400-ppm lead and 1.0 ppm beryllium the grid is clean and the sub-grid composite samples are discarded. If the grid sample is greater than 1,400-PPM lead or 1.0 ppm beryllium then the sub-grid samples may be analyzed to determine the affected areas. 144 samples were collected for confirmation sampling of lead/beryllium excavation areas.

Excavation began at the southwest corner of the lot. Initially, the excavation depth was two feet. However, the depth varied between 1 and 2 feet depending upon visual inspection of the soil. The clay layer was close to the original grade west of the Pettibone Creek. The lead contamination is limited to the surface on the West Side of the lot. The first grid, F-001, was placed at the southwest corner of the lot. Excavation continued north into grids F-002 through F-005. Additional excavation was required for sub-grid B of grid F-005 due to elevated level of beryllium above the clean-up objective. See Table 3.4 for grid confirmation results. Excavation sidewall samples were collected along the edge of property line. This sample type was eliminated because the material at the edge of the property leads under the road, sidewalk, and railroad property, which are engineered barriers to rain events and prevents leaching of contaminants.

Excavation continued from the northwest corner of the lot southward to meet grid F-005. Sub-grids B, C and D of grid F-007 required additional excavation due to elevated level of beryllium above the clean-up objective. Grid F-009 was the last grid on the West Side of the creek.

Excavation continued on the East Side of Pettibone Creek on the south end of the lot. This was grid F-010. Excavation continued northward through grid F-017. Grids F-010, -012, -013, -014, -016, and -017 required additional excavation. The final average excavation depths of each grid are found in Table 3.4.



OHM Project No. 20892

Drawing No.
20892-A7

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Excavation continued from grid F-022 through F-043. Approximately 15 feet by 1000 feet, along the Fansteel property line, was not excavated. A 240 psi gas main was located 10-12 feet from the property line at a depth of 2 feet. Safety was the main reason for non-removal of contaminated soil. The top two feet through the length of non-excavated area consists of intermixed topsoil, slag, and gravel. The side profile as observed from the excavated grids adjacent to the non-excavated area from the north end of the site moving south for 300-400 feet consists of slag at 3-4 feet below grade. This is immediately under the gas main. The material below the slag is stained, dark brown, to a depth of 5-6 feet. Below this is tan sand. The sand is below the groundwater table. At the 350-450 feet section, building debris is present from grade to a depth of 3-4 feet. Sandy clay is present below the debris. At the 400-750 feet section the profile of excavation is 2-3 feet in depth. The material consists of slag, topsoil, and gravel. From the 750 feet to Martin Luther King Jr. Drive section the depth of the slag layer is 3-4 feet with stained soil to 5-6 feet. A light scrape to a depth of 6 inches was performed on the surface of the non-excavated soils above the gas main. Because of the 15 feet clearance and the angle of the property line, several confirmation grids have been eliminated. These grids are F-035, F-038, F-041 and F-044. As excavation continued, available space to stockpile soil diminished. Therefore plastic was placed over excavated areas and stockpiling continued.

The haul road was the last material to be removed. This area was sampled separately from the plotted grids. Because of the limited space available for stockpiling at this time, plastic was placed on the areas previously confirmed clean to receive the contaminated material from the haul road. After treatment and removal of this material the area was scraped, sampled and analyzed to confirm that the stockpile material was completely removed. Sample results indicated elevated lead concentrations in these areas. In the spring of 1999 these areas were excavated and sampled. All areas were below the action level for lead. The final confirmation results consisting of sample numbers FC-007 through FC-011 are included in Table 3.4.

Table 3.4

Average Depth of Grid Excavation and Final Results

Grid Number	Depth, ft	Sample Result, Lead, ppm	Sample Result, Beryllium, ppm	Grid Number	Depth, ft	Sample Result, Lead, ppm	Sample Result, Beryllium, ppm
F-001	2	640	0.55	F-024	3	1040	1.01
F-002	2	500	0.82	F-025	4	665	<0.5
F-003	1.5	650	0.74	F-026	5	Sub-grid C 708, Sub-grid D 413, Sub-grids A/B 19	<0.5
F-004	1.5	220	0.50	F-027	4	I-comp 30.6	<0.5
F-005	2.5	320 – comp	Sub-grid A 1.0, Sub-grid B <0.5, Sub-grid C <0.5, Sub-grid D <0.5	F-028	5	850	<0.5
F-006	2	190	0.50	F-029	4	North Half 24, South Half 738	<0.5
F-007	3	400 – comp	Sub-grid A 0.7, Sub-grid B <0.5, Sub-grid C <0.5, Sub-grid D <0.5	F-030	5	39.1	0.62
F-008	2	120	0.61	F-031	3	Sub-grid A 18, Sub-grid B 74.7, Sub-grid C 9, Sub-grid D 372	0.62
F-009	2	89	0.69	F-032	3	North Half 95.7, South Half 404	North Half 0.55, South Half 0.56
F-010	5	J-comp 1200	<0.5	F-033	2	323	0.6
F-011	3	1100	<0.5	F-034	2	312	0.50
F-012	4	Sub-grid A 180, Sub-grid B 29, Sub-grid C 120, Sub-grid D 11	<0.5	F-036	2	473	0.57
F-013	4	310	0.52	F-037	3	42	<0.5
F-014	5	Sub-grid A 1200, Sub-grid B 720, Sub-grid C 26, Sub-grid D 21	I – comp <0.5	F-039	4	62	<0.5
F-015	2	81	<0.5	F-040	4	520	0.6
F-016	6	Sub-grid A 1000, Sub-grid B 290, Sub-grid C 530, Sub-grid D 210		F-042	3	46.2	<0.5
F-017	9	G-comp 530	0.71	F-043	3	78.3	0.6
F-018*	5	I-comp 1130	<0.5	F-036R	2	252	0.60
F-019	4	G-comp 1160	<0.5	F-037R	3	21	0.62
F-020	3	H-comp 1000	0.55	F-039R	4	116	0.5
F-021*	5	190	<0.5	F-042R	3	12.5	0.77
F-022*	5	222	0.5	F-043R	3	28	0.5
F-023	4	1110	0.57	FC-007	.5	15.2	N/A
				FC-008	.5	21.4	N/A
				FC-009	.5	87.2	N/A
				FC-010	.5	4.85	N/A
				FC-011	.5	27.9	N/A

• Depth includes soil mounded above original grade

3.7.1.5.2 PCB Confirmation

The PCB contaminated soils were segregated and stockpiled. The excavation was sampled and screened prior to sampling for confirmation. A total of 29 samples were prepared using DTech soil extract kits and tested using the immunoassay test kits and semi-quantitated with a DTech meter. All 29 samples passed without having to re-excavate. A total of 23 samples were collected for confirmation. Table 3.5 lists the results of the PCB confirmation samples. Figure 3.5, PCB Confirmation Sample Locations, shows the location of the confirmation samples. The sample locations were based on the MRI grid methodology. See Section 3.7.3, Field Activities, for a description of the MRI grid layout. A MRI grid was plotted on the main PCB area for confirmation sampling. All samples passed the clean-up criteria at the depth of two feet. The stockpile was sampled for determination of PCB concentration. The Total PCB analysis, 20 mg/kg, confirmed that the soil was not a TSCA waste.

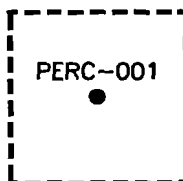
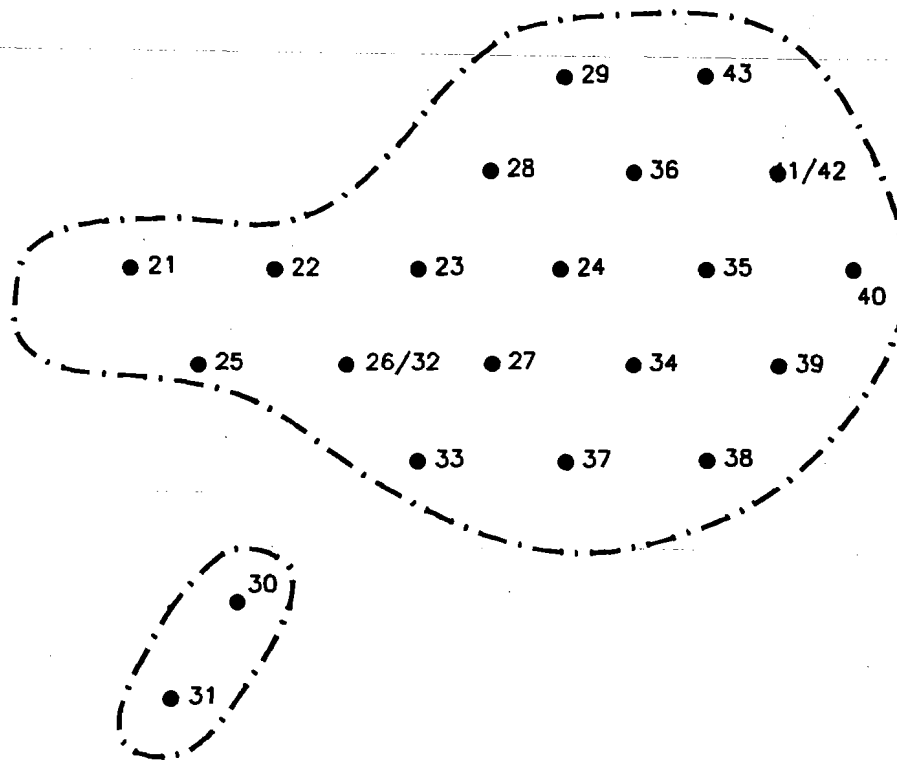
The remainder of the PCB area was excavated. The stockpile was sampled and analyzed for Total PCB to determine if the soil would be TSCA waste or a RCRA waste. The PCB concentration was 35 mg/kg. Therefore the soil is considered a RCRA waste which was treated to stabilize the lead component.

Table 3.5

PCB Confirmation Results

Sample ID	Result, ppm	Sample ID	Result, ppm	Sample ID	Result, ppm
P-021	<0.05	P-029	<0.05	P-037	<0.2
P-022	<0.67	P-030	<0.05	P-038	<0.2
P-023	<0.05	P-031	<0.05	P-039	0.593
P-024	<0.05	P-032*	<0.05	P-040	<0.2
P-025	<0.05	P-033	<0.05	P-041	<0.2
P-026	<0.05	P-034	<0.2	P-042**	<0.16
P-027	<0.064	P-035	<0.2	P-043	<0.2
P-028	<0.05	P-036	<0.2		

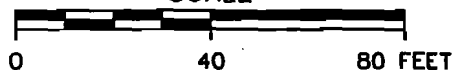
* P-032 is a duplicate of P-026, ** P-042 is a duplicate of P-041



LEGEND:

- · — PCB
- - - PERC
- 21 SAMPLE LOCATION

SCALE



FANSTEEL PROPERTY LINE



**OHM Remediation
Services Corp.**

OHM Project No. 20892

Drawn By: R. WEIBLE	Checked By: P. Conley	Approved By: T. Warren
Date: 9 FEB 99	Scale: AS SHOWN	Drawing No. 20892-A8

FIGURE 3.5
PCB CONFIRMATION SAMPLE LOCATIONS
VACANT LOT SITE
NORTH CHICAGO, ILLINOIS

PREPARED FOR
UNITED STATES ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

3.7.1.5.3 Tetrachloroethene Confirmation

A small area, 30' by 30' located around EE/CA node I2 was excavated to a depth of 2.5 feet and segregated for the analysis of tetrachloroethene (PERC). The EE/CA report identified a detection of PERC above the clean-up objective. Removal of contaminated soil was confirmed by analysis of the excavation floor sample. A sample was collected from the PERC stockpile to determine if a hazardous characteristic is present. The level of PERC was 2.3 mg/kg. The landfill acceptance level for PERC is 0.7 mg/L, a TCLP value. By applying the 1:20 rule, the amount of PERC that would leach from the soil is 1/20 of 2.3 or 0.12 mg/L. Based on this rule the pile is considered non-RCRA and was disposed of with other lead contaminated soils.

3.7.1.5.4 Fence Line Excavation Confirmation

Typically on Saturdays excavation along the perimeter was completed from outside the fence line. A total of 16 fence line composite samples were collected to confirm the removal of contaminants. Two feet was the maximum depth of excavation. Table 3.6 lists the values present at the depth of 2 feet. Samples FL-001 and FL-002 were above clean up goals and required further excavation. Sample number FL-015 was inadvertently skipped.

Table 3.6
Fence Line Confirmation Results

Sample ID	Lead Result, ppm	Beryllium Result, ppm	Sample ID	Lead Result, ppm	Beryllium Result, ppm
FL-003	64	<0.5	FL-010	20	0.54
FL-004	150	<0.5	FL-011	54	0.29
FL-005	84	<0.5	FL-012	33	0.60
FL-006	9.2	<0.5	FL-013	53	1.1
FL-007	9.0	<0.5	FL-014	17	<0.5
FL-008	22	<0.5	FL-016	749	0.53
FL-009	16	<0.5	FL-017	8.82	<0.5

3.7.1.5.5 Creek Slope and Sediment Confirmation

The creek slopes and sediments were excavated simultaneously with PCB and PERC excavation. Confirmation samples were collected for the creek slopes and sediment. There were 18 sections that covered the creek slopes and sediment. PS-01, PS-02, PS-03, PS-06, PS-07, PS-10, and PS-12 required additional excavation. The stockpile was sampled for landfill disposal parameters. Table 3.7 lists the confirmation results for the creek slopes and sediment. Creek samples were not divided into sub-grids. A total of 29 samples were collected for confirmation sampling of the creek sediment and soil.

Table 3.7**Creek Slope and Sediment Confirmation Results**

Creek Section	Lead Result, ppm	Beryllium Result, ppm	Polynuclear Aromatic Hydrocarbon
01	620	<0.5	BAL*
02	260	0.5	BAL
03	1200	0.55	BAL
04	110	<0.05	BAL
05	840	<0.05	BAL
06	300	<0.5	BAL
07	1000	0.5	BAL
08	170	0.5	BAL
09	50	0.5	BAL
10	310	0.91	BAL
11	59	0.5	BAL
12	77	0.61	BAL
13	480	<0.5	BAL
14	450	<0.5	BAL
15 South	5	<0.5	BAL
15 North	1000	<0.5	BAL
16	30	0.5	BAL
17	9.8	<0.5	BAL
18	61	<0.5	BAL

- - BAL – below action level. There are several PAH target compounds. All are below respective cleanup criteria.

3.7.1.5.6 Railroad Property

The area adjacent to the elevated railroad at the north end of the site is termed the railroad property. With permission from the railroad officials, the lead contamination was excavated. Several rounds of sampling and excavating were performed. To ensure the integrity of the railroad bed, the excavation followed the slope of the bed and then stopped.

3.7.1.6 Treatment Confirmation

Stockpiles, which exhibited lead toxicity, were stabilized with "Enviro Blend", a 50/50 blend of EnviroMag (magnesium oxide) and Envirophos (calcium phosphate). The mixture of soil with Enviro Blend reduces the solubility of the lead component. Initially, 1000 cubic yard piles were tested. This material went to an Illinois landfill. Later, 300 cubic yard piles were tested. This was a requirement for the Wisconsin landfill. If the lead toxicity level, 5.0 mg/L, was exceeded the stockpile was retreated. 82 composite samples were collected to demonstrate the stabilization of the lead component in the soil.

3.7.1.7 Backfill Confirmation

Clean backfill was imported to fill several areas of the site. One backfill composite sample was obtained for every 5,000 cubic yards placed. Confirmation results indicated

the backfill was free of trace organic contaminants. Lead was ND to 20 mg/kg.

The import material was leveled and lightly compacted with a dozer. After placement of material a ten-point composite was collected of backfill material. A grab sample was collected for the volatile analysis with an Encore sampler. The sample was analyzed for the Tiered Approach to Clean-up Objectives list (TACO). Approximately 9,800 cubic yards of backfill was delivered to the site. Stone was not sampled. Two backfill composite samples were collected for the analysis of the TACO listed analytes.

3.7.2 Site Investigation of Discharge Pipes and Unknown Container

During the excavation on the East Side, certain vapors were noticed by smell. Upon further investigation, a discharge pipe from EMCO Chemical Inc. (EMCO) was discharging product into Pettibone Creek in the middle of the vacant lot site. A sample was collected and analyzed to determine the main components of the organic liquid. The results of that sample are presented in Table 3.8. EMCO assured the USACE-OSR that the pipe was out of service. Absorbent booms were placed at the discharge point and down gradient from the culvert pipe. EMCO hired a contractor to pump the effected area of the creek. No further incidents occurred.

Between grids F-022 and F-0024 a five-gallon container was inadvertently uncovered and punctured during excavation operations. Unknowns were not expected within the site. Nevertheless, the contents of the container began fuming for several minutes then stopped. The liquid was suspected to be an acid. After reviewing options with the USACE, the site safety officer, and the site chemist, the determination was to cover the container to prevent further fuming. Appropriate PPE consisting of level B respiratory protection with saran suits were brought in to protect the workers while the container was uncovered and contaminated soils were drummed. When the container was uncovered it was noticed that all of the liquid had leaked from the container. A sample of the contaminated soil was obtained and analyzed at an off-site laboratory for hazardous characteristics (hazcat). Environmental Chemical Corporation provided the analysis since Great Lakes Analytical did not have that capability. The results did not show the suspected acid to be a significant hazard after being exposed to the soil. The pH result did not support the acid claim. Evidently the acid like material had reacted with the soil eliminating the hazardous characteristic. The hazcat analysis indicated the soil was negative for air reactivity, ignitability, reactivity, oxidizer, peroxide, sulfide, cyanide and halogens using the Beilstein test. Water solubility was positive and the pH was 5. Therefore, the effected soils were placed into the lead-contaminated piles for treatment. As a precaution, the equipment operator who uncovered the container was sent for a medical examination immediately following the incident. The operator was released from the doctors office with no symptoms of a chemical exposure.

Table 3.8

Pettibone Creek Discharge Pipe Water Analysis

Volatile Organics (EPA 8260) Sample ID: EMCO-DP-002			Semi-Volatile Organics (EPA 8270) Sample ID: EMCO-DP-001		
Analyte	Detection Limit ug/L	Sample Result ug/L	Analyte	Detection Limit ug/L	Sample Result ug/L
Acetone	100	120A	2,4- Dinitrotoluene	20	N.D.
Benzene	20	N.D.	2,6-Dinitrotoluene	20	N.D.
Bromodichloromethane	20	N.D.	Fluoranthene	20	N.D.
Bromoform	20	N.D.	Fluorene	20	N.D.
Bromomethane	20	N.D.	Hexachlorobenzene	20	N.D.
2-Butanone	100	N.D.	Hexachlorobutadiene	20	N.D.
Carbon disulfide	20	N.D.	Hexachlorocyclopentadiene	20	N.D.
Carbon tetrachloride	20	N.D.	Hexachloroethane	20	N.D.
Chlorobenzene	20	N.D.	Ideno(1,2,3-cd)pyrene	20	N.D.
Chlorodibromomethane	20	N.D.	Isophorone	20	40
Chloroethane	20	N.D.	2-Methylnaphthalene	20	N.D.
2-Chloroethyl vinyl ether	100	N.D.	2-Methylphenol	20	N.D.
Chloroform	20	N.D.	4-Methylphenol	20	N.D.
Chloromethane	20	N.D.	Naphthalene	20	30
1,1-Dichloroethane	20	N.D.	2-Nitroaniline	100	N.D.
1,2-Dichloroethane	20	N.D.	3-Nitroaniline	100	N.D.
1,1-Dichloroethene	20	N.D.	4-Nitroaniline	100	N.D.
cis 1,2-Dichloroethene	20	230	Nitrobenzene	20	N.D.
trans 1,2-Dichloroethene	20	N.D.	2-Nitrophenol	20	N.D.
1,2-Dichloropropane	20	N.D.	4-Nitrophenol	100	N.D.
cis 1,3-Dichloropropene	20	N.D.	N-Nitrosodiphenylamine	20	N.D.
trans 1,3-Dichloropropene	20	N.D.	N-Nitroso-di-N-propylamine	20	N.D.
Ethylbenzene	20	N.D.	Pentachlorophenol	100	N.D.
2-Hexanone	100	N.D.	Phenanthrene	20	N.D.
Methylene chloride	20	N.D.	Phenol	20	N.D.
4-Methyl-2-pentanone	100	N.D.	Pyrene	20	N.D.
Styrene	20	N.D.	1,2,4-Trichlorobenzene	20	N.D.
1,1,2,2-Tetrachloroethane	20	N.D.	2,4,5-Trichlorophenol	100	N.D.
Tetrachloroethene	20	N.D.	2,4,6-Trichlorophenol	20	N.D.
Toluene	20	N.D.			
1,1,1-Trichloroethane	20	N.D.			
1,1,2-Trichloroethane	20	N.D.			
Trichloroethene	20	120			
Trichlorofluoromethane	20	N.D.			
Vinyl acetate	20	N.D.			
Vinyl chloride	20	N.D.			
Total Xylenes	20	500			

A= Laboratory artifact- concentrations found of this analyte are characteristic of laboratory artifact.

Table 3.8 (Continued)

Pettibone Creek Discharge Pipe Water Analysis

Polynuclear Aromatic Hydrocarbons (EPA 8310) Sample ID: EMCO-DP-001		
Analyte	Detection Limit mg/L (ppm)	Sample Result mg/L (ppm)
Acenaphthene	0.0050	N.D.
Acenaphthylene	0.0040	N.D.
Anthracene	0.00020	N.D.
Benzo (a) anthracene	0.000010	N.D.
Benzo (a) pyrene	0.000010	N.D.
Benzo (b) fluoranthene	0.000020	N.D.
Benzo (ghi) perylene	0.000060	N.D.
Benzo (k) fluoranthene	0.000010	N.D.
Chrysene	0.000050	N.D.
Dibenzo (a,h) anthracene	0.000020	N.D.
Fluoranthene	0.0010	N.D.
Fluorene	0.0010	N.D.
Indeno (1,2,3-cd) pyrene	0.00020	N.D.
Naphthalene	0.0030	0.026
Phenanthrene	0.00030	N.D.
Pyrene	0.0010	N.D.

3.7.3 Field Activities

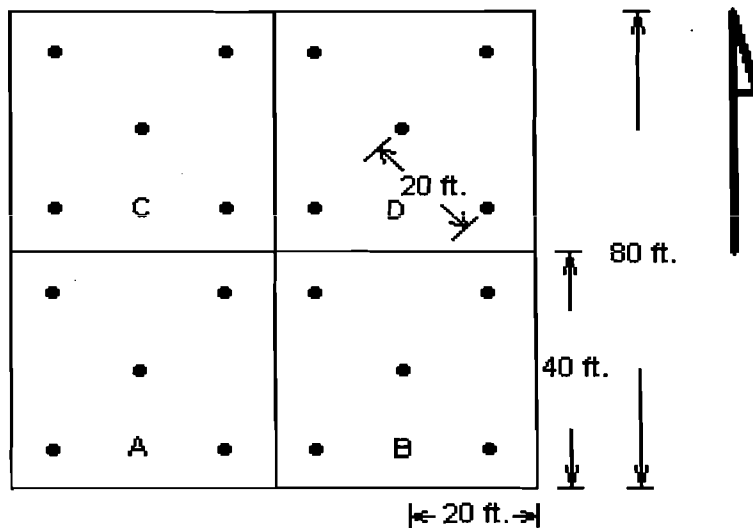
This section describes the process of collecting the samples and the documentation and reports completed to record the events.

3.7.3.1 Sampling Grid Confirmations

Grid confirmations were determined from surface soil samples obtained from a composite of four sub-grids making up an 80' x 80' grid. The excavated area was divided into 80' x 80' grids. Each grid was then sub-divided into four 40' x 40' grids. Five points were selected for a composite of the sub-grid (See Figure 3.6). Clean gloves were donned and a decontaminated stainless steel trowel was used to collect the sample. A split was retained for each sub-grid and the remaining sample was placed into a stainless steel mixing bowl. The four sub-grids were composited in the mixing bowl for the confirmation sample that represents the 80' x 80'. If the result of the 80' x 80' grid was above the 1,400 mg/kg Lead or 1.0 mg/kg Beryllium target level then the split samples representing the 40' x 40' grid were submitted for analysis.

Figure 3.6

80 ft. x 80 ft. Grid



3.7.3.2 MRI Grid Confirmation

The number of samples for confirmation of PCB removal is based on a triangular grid derived from the area dimensions and a 90% confidence level to satisfy sample area coverage.

The number of grid sample points is derived from the measurement of the radius from the center of the PCB area to its longest dimension. Without recreating the formula, 37 samples sufficiently cover the entire area. However, all spill areas are not circular. Therefore some of the plotted points fall outside the defined area. These samples are eliminated. Each sample measured 23.5 feet from adjacent samples resulting in a triangular grid. 19 sample points were located for the confirmation of PCB removal.

3.7.3.3 Stockpile Sampling

Ten random areas were selected around a 1000 cubic yard pile. A shovel was used to dig 1-2 feet into the pile. Clean gloves were donned and a stainless steel trowel was used to collect the sample. The sample was placed into a decontaminated stainless steel mixing bowl. Once all ten areas were sampled the material was mixed in the bowl for the composite sample.

3.7.3.4 Creek Slope and Sediment Sampling

The creek was divided into 18 sections. Six sections for each slope and six sections for the sediment. The sections were 160' in length, except the three sections at the south end of the site that were 60'. Ten grab samples made up the section composite sample. For the slope sampling, a shovel was used to dig 1-2 feet into the slope. Clean gloves were donned and a decontaminated stainless steel trowel was used to collect the sample. The sample was placed into a decontaminated stainless steel mixing bowl. Once all ten locations were sampled the material was mixed in the bowl for the composite sample. The sample was collected into a labeled, 4-ounce jar.

For sediment samples two sampling techniques were employed. After the excavation of the sediment, water would seep into the creek covering the sediment. A shovel was used to cut a one square foot "block" of material. The material was then lifted out of the water. The "block" was then broken apart to retrieve the dry sample portion unexposed to the water. The other method employed an excavator bucket. The block that was lifted out of the water was broken apart to retrieve the dry sample portion unexposed to the water. The excavator method proved to be efficient and safer. In each case clean gloves were donned and a decontaminated stainless steel towel was used to collect the sample into a decontaminated stainless steel bowl. Once all ten locations were sampled the material was mixed in the bowl for the composite sample. The sample was collected into a labeled, 4-ounce jar.

3.7.3.5 Backfill Sampling

Import backfill material was delivered to the site. An operator graded and compacted the backfill by tracking over the material repeatedly. A composite sample was collected to represent 5000 cubic yards of material. The first backfill composite was collected after placement of soil. The next sample composites were collected from the loads as they were brought to the site. Clean gloves were donned. Ten random locations were selected

for the composite. A decontaminated stainless steel trowel was used to retrieve the samples into a decontaminated stainless steel mixing bowl. Once all ten locations were sampled the material was mixed in the bowl for the composite sample. The sample was collected into a labeled, 4-ounce jar. One location was selected for the grab sample for the analysis of volatiles. An Encore sampler was used.

3.7.3.6 Documentation

A chain-of-custody was completed for all samples sent to the laboratory. The applicable site information was completed for each section. Sample labels identified the location and type of sample collected. Pertinent information was recorded in the Sample Tracking Log. A daily report was completed describing the sampling events and communications between USACE representative and site chemist. The daily report was submitted to the USACE OSR as an attachment to the Rapid Response Quality Control Daily Reports.

3.7.3.7 Sample Packaging

Clear tape was placed over the sample label. Sample jars were wrapped in bubble wrap. The samples were placed in zipper lock baggies. Samples were placed into a cooler along with additional packaging to prevent movement. Ice was double bagged in zipper lock baggies. Four custody seals were placed over the lid of the cooler. The cooler was then taped closed with clear packing tape. The relevant information was completed on a courier packing slip for shipment. Ice was not used for samples analyzed for metals only. Typically, however, the laboratory provided courier service. Samples were then transferred to the laboratory's cooler for shipment.

3.7.3.8 Decontamination Procedures

The procedure for decontamination of sampling equipment was as follows:

- Brush off material prior to washing
- Wash off soil using Alconox detergent in a 5-gallon bucket containing water
- Rinse off Alconox with water
- Rinse equipment with 10 % Nitric acid solution (for metals only)
- Finally rinse equipment with water
- Allow to air dry
- Wrap sampling equipment with aluminum foil if not used immediately
- If the analysis is for organics then the following additional steps are taken after the final water rinse
- Rinse with Isopropanol
- Rinse with water

3.8 Backfill and site Restoration

Following excavation and receipt of clean confirmation analysis, the area to the west of Pettibone creek and the railroad property was backfilled with clean import soil and/or

stone. The soil was sampled as described in Section 3.7 "Sampling and Analysis". Backfilling was performed east of Pettibone Creek only where necessary to eliminate site hazards such as excavations along the perimeter of the site. Approximately 9,800 cubic yards of fill material was imported and placed. A dozer was used to spread and compact the import material. It was decided that no re-seeding of the site would be necessary.

3.9 Demobilization

Demobilization consisted of the return of personnel and equipment to their home base and the return of all rented equipment and supplies. Demobilization was an ongoing effort as individual phases of the project were completed and personnel, equipment and supplies were demobilized. Initial demobilization was completed on January 18, 1999. Personnel returned to the site in May of 1999 for the final excavation and load out of the stockpile area soils. The final demobilization was complete on May 25, 1999.